

Rhode Island Proves that Good Things Come in Small Packages

Rhode Island is the smallest state in the union. And with just 1,100 square miles of land compared to 650 miles of shoreline, it is no wonder it is considered the ocean state. Ewa King, the state's associate director of health and manager of the Department of Health Laboratories (Health Laboratories), pointed out that recreational beaches are one of the "main assets of the state," outlasting the heyday of Rhode Island's once-famous jewelry industry and other manufacturing enterprises.

King, a native of Poland who first came to the US in 1990 to do biochemistry research at Brown University, has found that the Rhode Island's small size may be another asset. With just over a million residents and a dozen or so hospitals, the state gets by with just one health department and one public health laboratory, which simplifies networking. And because the entire state can be traversed by car in an hour, stakeholder meetings are usually face-to-face and specimen transport is much simplified.

"Generally," said King, "we receive all specimens the day of collection or the day after if the collection occurred at night or in the late afternoon. Generally, we do not receive specimens or environmental samples by mail; everything is brought right over to us. If there is a problem, we can just get in the car and go and get it. It's pretty easy for us, really."

Because of its singular position, the laboratory performs high-level reference testing as well as routine procedures to support patient care—such as STD testing for community health centers—that in larger states might be handled by a local public health laboratory. However, the Health Laboratories is more versatile yet: as a consolidated laboratory it not only performs clinical work, but also environmental testing, food chemistry and forensic science. When, for example, a clam digger contracted *Vibrio vulnificus* (a saltwater

bacterium) this past summer, the laboratory was able to identify the organism in both the patient's specimen and in samples of seawater collected along the coast.

"We have a broad range of programs and customers that you might not necessarily find in a traditional public health lab," said King. "I do think that, especially for a relatively small state in terms of area or population, this is really the most efficient way of providing laboratory services."

expertise," said King. "I get to see the latest technologies employed in different areas of science." A recent example of dual-use technology is one of the Health Laboratories' newest protocols—a test for cyanide poisoning. The test was validated for chemical terrorism work, but now may also be used to assist the state medical examiner in cases where cyanide poisoning is suspected as a cause of death.

King, who is an enzymologist by training, is especially interested in exploiting the overlap in environmental



photo courtesy of Rhode Island Department of Health

Staff members of Rhode Island's serology lab

Among the laboratory's less traditional pursuits are a breath analysis program to support Rhode Island police, a water monitoring program to support the shellfishing industry in Narragansett Bay, a program to screen farm livestock for disease and a certification program for drinking and waste water testing laboratories. The Rhode Island Health Laboratories is one of few public health laboratories in the country that has its own ambient air testing program to monitor pollutants, such as the soot that blows into the state from midwestern coal mines and power plants.

"We get to keep a lot of scientists under one roof and they get to share their

chemistry and biomonitoring. "We're looking for the same chemicals in air, water and people's blood. We expect to see some similarities," she said. The laboratory has just begun work with the Memorial Hospital of Rhode Island to test umbilical cord blood for heavy metals: mercury, cadmium and lead.

Another key interest of the laboratory director is quality assurance (QA). When King began her tenure at the Health Laboratories—after doing post-doctoral work in Paris ("more enzymes, but in a different country") and a stint in a commercial environmental laboratory—she started out as a QA officer. And when she took over as director in

early 2006, the entire department of health was in the midst of establishing performance measures to gauge the quality of department services.

One of King's first administrative projects as director was to meet with internal health department customers to find out "what is it they expect of the laboratory?" "Sometimes," said King, "we assume we know what our customers want, but it's not always what they would say." Among King's surprise findings was that "some programs that we assume have no laboratory component

- Are you satisfied with the way we handled your complaint?

The push to sync laboratory services with community needs builds on a long tradition in Rhode Island. The Health Laboratories was one of the first two public health laboratories established in the US and began by offering two services—examination of sputum for tuberculosis (TB) and throat cultures for diphtheria—to private physicians in 1894. A guiding philosophy was to fill gaps in the laboratory services generally available in the community. Thus, the

“Our main performance measure will be customer satisfaction.—*Ewa King, associate director of health and manager of the Rhode Island Department of Health Laboratories*”

really do have one.” Smoking cessation programs, for example, would like to use blood cotinine measures to evaluate program effectiveness.

Said the former QA officer, “Quality is about delivering exactly what your customers need and want.”

Based on the general findings of King's interviews, laboratory staff have designed a short questionnaire, which they plan to administer annually to internal customers and then extend to external customers, such as private physicians, police, the state attorney general and others.

Among the questions:

- Why do you choose to use the Rhode Island Department of Health Laboratories as opposed to contracting with a commercial laboratory?
- How satisfied are you with turn-around-times? Quality of services? Staff response time?
- Is the scope of our services responsive to your needs?
- Are our reports easy to interpret and use?

laboratory started a program for tissue pathology in 1915, biochemistry in the 1920s, toxicology in 1928, metabolic diseases in 1964 and, more recently, food safety and environmental testing.

Updating the laboratory's philosophy for the 21st century, King said, “Our main performance measure will be customer satisfaction.”

But as King strives to hone the laboratory's services, efficiency is necessarily a concern. The Health Laboratories employs 81 full-time employees and has three authorized vacancies. But these numbers, she said, “don't tell the full story,” owing to “structural deficits” in the organization's allotted workforce.

“We recognize there is a mismatch between available personnel and the workload,” she said, particularly in the forensics section of the laboratory, which has seen a steady uptick in its work as DNA has gained popularity as a tool for criminal investigations. In King's estimation, laboratory backlogs could be eliminated with eight to ten additional scientists.

Of course, staffing is related to the laboratory's budget, which comes entirely from state appropriations and federal

grants. The Health Laboratories charges fees for many of its services, but this income goes directly to the state treasury.

In the past year, the laboratory received roughly \$7 million in state appropriations and \$2.5 million in federal grants, which is about half a million dollars less than it received the year before. Said King, “We have taken a real hit in terms of federal funding.” The hit has been felt most in the facility's environmental lead laboratory—which is funded through the CDC Childhood Lead Poisoning Prevention grant—and the emergency preparedness program—which is partly funded through the federal Public Health Emergency Preparedness grant.

“Loss of federal funding has to be one of our biggest challenges at the moment,” said King, who also noted that the entire state of Rhode Island faces a deficit of about \$100 million.

Another challenge is the laboratory's physical infrastructure. Throughout its long history, the Health Laboratories has operated under less than ideal conditions; first in a corner of a hospital, then in one room in the basement of the State House, and now in a 28-year-old, nearly windowless office building by the train tracks. As public health laboratories become more high-tech, the Health Laboratories' aging 60,000-square-foot facility has become more and more of a handicap. “Installing equipment,” said King, “can take up to a year because of required changes in the HVAC system. This significantly impacts our ability to implement changes in our programs.” A large, new BSL-3 suite lies unfinished and unused, partly because of problems with the air handling system.

Given the state's fiscal situation, a new laboratory building is probably off the table in the near future. Instead, King is focusing her attention on other matters: streamlining high-volume testing and support services through automation, coordinating environmental and human testing, and getting to the point where QA is appreciated “as something more than filling out a bunch of forms.”